

Attorney Docket No. I-8380

PATENT

What is claimed is

1. A composite comprising at least one body layer having a roughly textured face and a cover layer of a solid of a cured liquid cast on the textured face, in which the cover layer has a substantially uniform thickness and is permanently embedded into the body layer to a depth less than the thickness.
2. The composite of claim 1 in which the body layer is an insulation layer of cellular foam or nonwoven fibers.
3. The composite of claim 2 in which the body layer consists essentially of fiberglass.
4. The composite of claim 1 in which the cover layer is a flexible polymer selected from the group consisting of acrylic polymer, polyvinyl acetate, polystyrene, and a mixture of at least two of them.
5. The composite of claim 4 in which the flexible polymer is acrylic polymer.
6. The composite of claim 1 in which the uniform thickness is in the range of about 0.01 to 1 mm.
7. The composite of claim 6 in which the uniform thickness of the cover layer varies by at most about 1 mm.
8. The composite of claim 6 in which the cover layer is embedded to a depth of at most about 95 % of the uniform thickness.

Attorney Docket No. I-8380

PATENT

9. The composite of claim 1 which comprises a body layer faced with a second web of a nonwoven, net or scrim fabric and in which the second web is embedded in the cover layer.

10. The composite of claim 9 in which the body layer is a nonwoven of wet laid glass fiber and the second web is a nonwoven of thickness in the range of about 0.062 - 0.25 inch.

11. An apparatus for casting a uniform thickness of a curable liquid onto an upper surface of a horizontally moving web comprising  
a pair of parallel, laterally spaced apart, vertical side plates, each plate defining a bottom edge;  
a coating bar disposed horizontally between the side plates above the bottom edges, the coating bar having a corrugated axial profile defined by a plurality of alternating downwardly facing ridges and grooves;  
support means for carrying the moving web in contact with the downwardly facing ridges in a machine direction parallel to the plates; and  
nozzle means upstream of coating bar and between the plates for delivering the curable liquid onto the upper surface of the moving web.

12. The apparatus of claim 11 which further comprises pivot means on the side plates adapted to allow the plates and coating bar to freely pivot about a horizontal axis thereby causing the downwardly facing ridges to maintain contact with the web at a highest lateral point of the upper surface.

13. The apparatus of claim 11 in which the coating bar comprises a rod member and a spiral wound wire member wrapped around the rod member.

14. The apparatus of claim 11 in which the ridges and grooves are machined from a rod.

Attorney Docket No. I-3380

PATENT

15. The apparatus of claim 14 in which the coating bar comprises a threaded rod.
16. The apparatus of claim 13 in which the apparatus further comprises a rigid backing plate affixed to the coating bar along the length of the bar.
17. The apparatus of claim 16 in which the backing plate comprises a vertical plate  
5 affixed to the top of the coating bar.
18. The apparatus of claim 17 in which the vertical plate has a height in the range of about 2 - 50 times the diameter of the coating bar.
19. The apparatus of claim 13 in which the rod member is cylindrical.
20. The apparatus of claim 19 in which the rod member has a diameter in the range  
10 of about 6 - 50 mm.
21. The apparatus of claim 19 in which the wire has a diameter in the range of about 50 - 500  $\mu$ m.
22. The apparatus of claim 12 in which the coating bar and the web are in operative contact under an applied force and which apparatus further comprises  
15 compression means for maintaining the applied force in a range effective to maintain contact of the web along all of the cross machine direction with the coating bar.
23. The apparatus of claim 22 in which the compression means comprises weights selected to induce the applied force.
24. A process for making an insulation composite comprising the steps of

Attorney Docket No. I-8380

PATENT

1  
placing in a substantially horizontal position a body layer of insulating material  
having an upwardly directed, roughly textured face;  
casting a liquid capable of curing to a solid onto the textured face;  
moving the body layer horizontally relative to a horizontally disposed coating  
5 bar having a downwardly facing corrugated axial profile defining  
alternating ridges and grooves such that the ridges contact the face;  
pressing a first portion of the liquid in proximity of the ridges into the body  
layer while passing a second portion of the liquid through the grooves;  
allowing the second portion of the liquid to settle in a substantially uniform  
10 thickness layer over the first portion of liquid; and  
curing the liquid to a solid, thereby producing a cover layer of substantially  
uniform thickness permanently hedged in the face of the body layer.

25. The process of claim 24 in which the insulating material is cellular foam or  
nonwoven fibers having a density of 0.5-7 lbs/ft<sup>3</sup>.

15 26. The process of claim 24 in which the uniform thickness is in the range of about  
0.01 - 1 mm and the cover layer is embedded to a depth of at most about  
95% of the uniform thickness.

27. The process of claim 26 in which the body layer consists essentially of glass  
fibers and the liquid is an acrylic polymer latex.

20 28. The process of claim 24 in which the liquid has a viscosity of at least about  
1000 cps.

25 29. An insulation composite produced by a process comprising the steps of  
placing in a substantially horizontal position a body layer of insulating material  
having an upwardly directed, roughly textured face,  
casting a liquid capable of curing to a solid onto the textured face;

Attorney Docket No. I-8380

PATENT

moving the body layer horizontally relative to a horizontally disposed coating  
bar having a downwardly facing corrugated axial profile defining  
alternating ridges and grooves such that the ridges contact the face;  
pressing a first portion of the liquid in proximity of the ridges into the body  
5 layer while passing a second portion of the liquid through the grooves,  
allowing the second portion of the liquid to settle in a substantially uniform  
thickness layer over the first portion of liquid; and  
curing the liquid to a solid, thereby producing a cover layer of substantially  
uniform thickness permanently bedded in the face of the body layer.

ND 24  
A 7 8-2-97